MARINE REVIEW.

VOL. IV. CLEVELAND, OHIO, THURSDAY, AUGUST 20, 1891. No. 8.

Ore Shipments for the First Half of the Season.

The total shipments of ore from Lake Superior mines to August 1 was 2,885,000 gross tons. These figures are official, and the MARINE REVIEW gives assurance of their accuracy, although not permitted to state the source of information. On August 1 a year ago the mines had shipped 4,033,000 gross tons, so that the decrease to August 1 this season is 1,148,000 gross tons. When it is considered that the season of ore shipments was not fairly begun until June 1 and that about 2,000,000 tons had been shipped at that time a year ago, the movement during June and July is remarkable. The great gain is from Escanaba and Gladstone, as the Sault canal to August 1 shows shipments from Lake Superior of but 1,330,619 gross tons, notwithstanding the heavy movement from Two Harbors. Figures prepared by the Iron Trade Review last week, and also received from official sources, show that of this total output of 2,885,000 tons to August 1, 1,998,131 tons were received at Ohio ports. The balance going mainly to South Chicago and Detroit was, accordingly, 886,869 tons.

This summary of receipts so far this season would indicate that the total output of the mines can hardly be brought up to 6,000,000 tons, although it will undoubtedly be close to that figure. The great bulk of the wild tonnage has been engaged in the ore trade up to this time but the movement of grain during the latter part of the season will demand a large portion of the available floating property, and little, if any, unsold ore will be brought down even at the existing rates of freight.

The Minnesota Iron Company had shipped on August 12, 267,454 gross tons of ore and the Chandler 186,650 tons, a total of 454,104 tons from Two Harbors. On the corresponding date in 1890 the Minnesota Company had shipped 310,956 tons and the Chandler 200,706 tons, a total of 511,652 tons. A decrease of 57,558 tons is thus shown, although shipments from the Minnesota mines are more active than any of the other Lake Superior districts.

Projects Connected with the McDougall Barges.

John D. Rockefeller is the heaviest stockholder in the American Steel Barge Company, as well as the other corporations that are now being linked with the business of constructing the whalebacks. Capt. Thomson Wilson, of Cleveland, is said to own one-eigth of the stock of the company, in addition to the advantage derived from management of the boats, and, although it is not generally known, Mr. Samuel Mather, one of the members of the firm of Pickands, Mather & Co., of Cleveland, who also holds close relations with the management of the Minnesota Iron Company and the Illinois Steel Company, was one of the first to subscribe for stock in the new type of boats. Colgate Hoyt of New York is president of the company and Charles L. Colby of Cleveland vice-president, and the directors are Colgate Hoyt, C. W. Wetmore and E. B. Bartlett of New York, Capt. Alex. McDougall and A. D. Thomson of Duluth, Charles L. Colby, Capt. Thomas Wilson and Samuel Mather of Cleveland.

In speaking of the affairs of the company when in Cleveland a short time ago Capt. McDougall said they would experience no trouble in getting material forthe construction of ships on Puget sound, as the cost of ship plate from England, duty included, is but little above the price paid for the same article on the lakes. But the plan is not to depend on the foreign material. Officials of the Northern Pacific Railway Company, who are interested in the barge company and also in the Everett Land Company, which has begun the work of building up a town at the point on Puget sound where the ship yard will be located, are the moving spirits in the West Superior Steel and Iron Company at the head of Lake Superior, where material will be turned out within a few months for ships to be constructed at the Puget sound plant, as well as at the West Superior yard. The freight on iron to the sound from West Superior over the Northern Pacific will, of course, be very low in comparision with that on iron from other districts. It is proposed to have the barges in the Pacific coast trade engage mainly in carrying coal from Puget sound districts to San Francisco. This trade is now hampered by a state control of docks and a system that keeps vessels weeks in unloading, as against days according to the lake system of great handling facilities and ample dock room, but the barge company has a plan of overcoming this difficulty, which Capt. McDougall explains but which it would not be well to give out at this time.

The Everett Land Company referred to here, and which, although a concern entirely separate in its management from the barge company, is backed up by the same capitalists, John D. Rockefeller, Henry Villard, C. B. Wright, Charles L. Colby, T. F. Oakes and others, contemplate an enterprise of much greater importance than the barges. This company has purchased 8,000 to 10,000 acres of land at the mouth of the Snohomish river, 30 miles north of Seattle on Puget sound, and it is at this point that the new town with a shipyard, rolling mills, sugar refinery,nail and lumber mills and other manufacturing industries will soon be in operation. For the present the mills will make iron from scrap, but there is no doubt of mineral wealth in the surrounding country. It is for this point that the barge Wetmore, just returned with water ballast from a trip to Liverpool with grain,is now loading ship-building machinery at Wilmington.

But these are not the only big projects now in hand by the same capitalists who are backing Capt. McDougall in the barge business. They are also leaders in the Cuban mining properties which Mr. S. P. Ely of the firm of George H. & S. P. Ely of Cleveland is now engaged in developing, and the work on which has advanced so that it is expected 500,000 tons of ore will be brought to this country next year, with shipments beginning in March. The barges will be engaged in this trade and it is also expected to have them continue in the general coasting business. In turning out whalebacks to the extent of 35,500 gross tons capacity in three years, the West Superior shipyard has done far more than was expected even by the most earnest supporters of the new type of vessels, and the outcome of the several big schemes that have sprung from the enterprise will be watched with a great deal of interest.

Lake Steamers that Could be Sent to the Coast.

Several of the big metal steamers now engaged in general freighting business on the lakes might be sent to the coast by the way of the Welland canal and the St. Lawrence river, if their owners found profit in such a move and were willing to have them shoot the rapids, as was done in the case of the McDougall barges. This could not be done with any of the big wooden steamers, however, as their draft of water running light is greater than will be admitted in the shallow portions of the St. Lawrence. The McDougall steamers that went to the coast in this way were 265 feet over all, 36 feet beam and 22 feet depth of hold, and the maximum draft, that of the Colby, when trimmed for the trip through the rapids was 7 feet aft and 5 feet 10 inches forward. The steel steamships J. H. Devereux and William Chisholm of the Cleveland Rolling Mill Company's fleet and the Spokane, owned by the Wilson Transit Company, are boats that fall within the dimensions just noted and that could in all probabilty be trimmed so as not to exceed the maximum draft.

Freight Situation—The Big Grain Crop.

All interest regarding lake freight is now centered in the movement of wheat from the head of Lake Superior, which will begin with the first few days of the coming month. High rates are expected, and there is no doubt that the shipments will surpass all records of previous years. Most vessel owners refuse to charter in advance at any price and the few who accepted 4 cents a short time ago on cargoes to be carried in October do not feel that they have any advantage in the market. Still, the grain shippers are not bidding for tonnage in advance. This is what one of the leading brokerage firms in Duluth sends us regarding the prospects.

"We look for shipments of at least 200 cargoes of wheat from here this fall, and in addition to this every elevator, grain bin and warehouse will be full to overflowing in ample time for the spring trade of 1892. Harvest operations throughout this section have become general, and our most conservative crop experts place the yield at 140,000,000 to 150,000,000 bushels. Of this amount the territory directly tributary to Duluth will send 40,000,000 bushels of the crop of 1891 to Duluth. The danger line is passed and there is now no doubt but what the entire crop will be safely gathered. Owing to the urgent export demand for wheat, we feel confident that every bushel forwarded from the interior between Sept. 1 and the close of navigation will be promptly shipped by lake from Duluth. While it is true that this movement will not become general until Sept. 20 or Oct. 1, yet shipments from the earlier districts will begin to arrive about Sept. 1 to Sept. 5. A few vessels will be wanted for this trade by the first of the month, and the demand for tonnage will continue to increase as the season advances."

The foregoing is certainly a very bullish summary of the situation. Two hundred cargoes of wheat of 1,600 tons average adds 320,000 tons to the Lake Superior movement of freight during the two closing months of navigation. It means five cargoes a day for fifty days in October and November, without taking into account the additional heavy shipments of flour.

The ore freight market has been settled during the past few days at $1.15 from Ashland, $1.10 from Marquette and 90 cents from Escanaba. Rates on soft coal from Ohio ports are based on 50 cents to Milwaukee and Chicago as well as ports at the head of Lake Superior.

Protection has Helped the Lake Trade.

The American Economist commenting on the low prices at which lake shipbuilders have taken contracts from the government for steel vessels of late, says: "On one contract for four light-ships that are to go to the coast the government saved over $70,000 by the presence of a shipbuilding industry on the lakes, and the average of the bids of all the lake builders was between $9,000 and $10,000 below the average bids of builders on the Atlantic. The lake builders have been building for a protected trade—the coasting trade—and it has been a good trade. If our builders on the sea coast had had during the past five or six years as large a proportional demand for steel ships as the lake builders have had, the whole country would probably be getting its ships 15 or 20 per cent. cheaper than now, and a great many more men would have had employment in iron making." There is no denying this argument. Protection given to the iron ore industry of Lake Superior has had most to do with the erection of shipbuilding plants that are the largest in the country.

Combined Capacity of the Whalebacks.

Eighteen vessels now comprising the fleet of the American Steel Barge Company on the lakes and the coast have a combined carrying capacity of 35,500 gross tons. This includes barge No. 116, which will be launched shortly at West Superior. Five of these boats, the steamers Colby and Wetmore and barges 110, 201 and 202, are on the coast and have a capacity of 7,300 gross tons, while the barges on the lakes have a capacity of 28,200 gross tons.

When it is considered that all of these vessels have been built within three years, there can be no doubt of the ability of the projectors of the barge enterprise to carry out the Puget sound ship-yard deal and other big schemes which they have under way. There is certainly no doubt of the success of the barges on the lakes, as they have run without serious accident of any kind, and their influence on the general freight carrying trade must also be admitted. Still, there is every reason to look for the building of a number of regular freight carriers in other ship yards during the coming winter, and although the builders of the barges express a willingness to take contracts from outsiders, the ownership of the whalebacks is still confined to the American Steel Barge Company.

Coal Statistics of Little Value.

If Ohio statistics on the general production of minerals are no more reliable than the figures on lake coal shipments recently presented by Hon. R. M. Hazeltine, chief inspector of Ohio mines and mining, in his sixteenth annual report to the governor, little reliance can be placed in them. The chief inspector says: "The demand for coal at lake ports to supply the trade in the northwest during portions of the year exceeded the carrying capacity of the railroads to such a degree as to greatly injure the trade in the mining regions, which depend on local markets for their trade. The total amount of coal shipped from the various lake ports from Buffalo to Toledo inclusive was 5,000,749 tons. Of this amount 1,808,749 tons was Ohio coal and 3,191,700 tons came from the Pennsylvania mines, leaving 2,281,886 tons, the princpal amount of which was forwarded by rail from Toledo. It is well known to lake coal shippers that the total movement of soft coal (Ohio produces no hard coal) from all Lake Erie ports during 1890 was but 3,107,826 tons, and this represents a very big trade. Of this coal 1,760,250 tons was from the Hocking valley and 1,347,566 tons the Pittsburgh district. These figures are from reports furnished the Pittsburgh Association of Lake Coal Shippers by the railway companies and are reliable. No good can come from any attempt to magnify a business of this kind.

Ratio of Heating Surface to Indicated Horse-Power.

The London Times in its criticisms of what is termed a speculative tendency in the new American warships said that "the area of heating surface allowed in the designer's estimate for each unit of indicated horse-power is considerably smaller in the American calculations than the area adopted by the British Admiralty as the result of practical experience." Secretary Tracy in a magazine article recently answered this and other criticisms by the Times. He showed conclusively that, with the single exception of the Baltimore every one of the latest American designs has a higher ratio of heating surface to indicate horse-power than appears in any of the British ships. Mr. Tracy adds that the Baltimore being of English design, might properly go into the British column English writers on the subject are now suggesting that it would probably be well for the Admiralty to follow the American example and give a more liberal allowance of heating surface for each indicated horse power, as the high ratio of heating surface means less work per square foot, and consequently greater endurance and longer life for the boilers.

Engravings in the MARINE REVIEW last week showing plans of the steel light-ships being constructed at the yard of F. W. Wheeler & Co., West Bay City, for service on the coast, were from the Railroad and Engineering Journal of New York. Failure to credit them at the time was due to an oversight. The journal has given a great deal of attention of late to the advancement of inland commerce, especially on the lakes.

Reports of the Lake Freight Market.

The MARINE REVIEW has been about right on the freight market this season. The following is taken from our issue of June 11, last: "The turning point has been reached in the lake trade. A most active season is assured from this time on, and it is more than probable that any of the ore dealers who may have sold ore at the very low prices of the past few weeks without providing for the lake freight will find small margins on such sales. The middle of June is at hand with the ore movement fully 1,500,000 tons short of that of a year ago and labor matters in such shape that it will yet be several days before boats are unloaded at Lake Erie ports with the usual regularity. The fall movement of grain will undoubtely be very heavy, as all preparations are being made with a view to handling the biggest crop the northwest has ever seen, and coal shippers admit that it will be necessary to continue throughout the season the present heavy movement of coal. The work of making contracts for delivery of ore during the season is about at an end and it is doubtful now if any more ore could be covered at the season rates that have prevailed during the past three weeks." Notwithstanding a slight drop in the market during the week following the report just quoted, the improvement anticipated has now come to stay.

Instructions for Navigating the Rivers.

A meeting of the Cleveland Vessel Owners' Association was to have been held, Wednesday, for the purpose of taking up the question of rules for navigating the rivers, a subject upon which the Lake Carriers' Association has been unable to agree. The meeting was postponed but will probably be held Thursday. After consulting managers of leading steamship lines in the ore trade, Capt. McKay and Mr. Harvey D. Goulder have prepared the following instructions, which differ somewhat from the code presented for the conisderation of the Lake Carriers' Association some time ago:

INSTRUCTIONS FOR NAVIGATING THE RIVERS.

To the Master of the Steamship: The following suggestions are not intended to add to or take from the regularly prescribed rules, but to keep before your mind the necessity, in the crowded state of the rivers, for all steamers to carry out the spirit and the letter of the rules of navigation.

1. Make the safety of your ship and of other ships in her vicinity your first and chief consideration. Speed and quick time must be subordinate to this. Do not hesitate, then, where prudence and safety demand or suggest it, to check, or stop, or back your ship.

2. So far as it depends on you, always have a clear understanding with any approaching steamer before you come within a half mile distance, as to how you are to pass. Blow your whistle anyway, and if an approaching steamer fails to blow enter the facts on your log and report the same to the manager on your first arrival thereafter.

3. Do not meet or attempt to pass vessels where the channel is crowded, but keep back out of the way. Avoid meeting or passing where more than two vessels will come abreast at substantially the same time. This should be done by the craft farthest away from the meeting point keeping back, but in all cases do what you can to keep out of and to prevent such an accumulation of vessels.

4. When overtaking another craft give the proper signal to indicate which side you will take. When an overtaking steamer is about to pass you, and blows the signal for either side, always answer such signal according to circumstances. If you have doubt about her ability to pass safely, take the extra precaution to promptly give the signal indicating your doubt.

5. Reduce the speed of your ship by checking in all narrow places, and when about to meet another craft on a bend. At all other times when about to meet something check down unless you can give so wide a berth that the displacement of water or suction cannot affect either vessel.

6. Do not attempt to pass any craft going the same way in any shoal or narrow place; nor at any time or place where you cannot give her so wide a berth that the displacement of water or suction cannot affect the steering of either vessel.

7. When going up give a descending boat preference in narrow water, especially at the Neebish and the Lime-Kiln crossing.

8. If a faster boat is coming up on you and requests and proposes to pass you, you are entitled to hold your course, but fair play requires that if you can yield, you should do so and give a faster vessel every reasonable facility in passing by you.

9. If another craft attempts to pass you in narrow or shoal water, blow her a signal to keep back. If she persists and comes close enough for the suction of either boat to affect the other, or in any case within 200 feet, do what you can, with safety to your own and other crafts, to let her go by. But in every such instance enter the facts at the time on your log and report the same to your manager on your next arrival.

10. In all cases where it is prudent or desirable to check, or to stop, or back, bear in mind that the efficacy of such precautions lies in adapting them in time. Therefore, be alert and ready to take any such precautionary steps early.

Notices to Mariners.

Commander Nicol Ludlow gives notice that the red second-class nun buoy, marking Ten foot shoal of Point Peninsula, north end of Green bay, has gone adrift. It will be replaced as soon as possible.

Vessel captains going to Chicago should beware of a platform being erected 8,000 feet from shore north-northeast of the Marine hospital and 2,000 feet west of the Lakeview crib. The city authorities announce that the platform will be lighted, but it will probably be by small lamps.

Bilge Keels on Yachts.

EDITOR MARINE REVIEW:—Reading your account of the launch of the steam yacht Wadena, I notice an error that it may be worth while to correct. You say "her bilge keels are the first ever used in yacht construction in this country, and excepting one case unknown until recently to the builders, the first in any country." Permit me to inform your readers that I put bilge keels on the steam yacht Idler, which I built for Mr. Warrington, of Chicago, as loug ago as 1872, I think. He desired something to counteract rolling, and I recommended, and supplied the bilge keels, which were about a foot deep in the mid-length, tapered to six inches at the ends. They extended about one-third the length of hull, and were put on outside the plank shortly before launching.

Bilge Keels were patented in this country by Mr. John W. Griffiths, once a partner of mine in publishing the Nautical Magazine and Naval Journal, more than twenty-five years ago. When he built the steam sloop of war Enterprise at Portsmouth N. H., about 1873, he put bilge keels on her on the order of the chief naval constructor, Isaiah Hanscome. Floor and bilge keels are well calculated to take the place of a center-board, for the purpose of furnishing resistance to lee-way. I recommended them in lieu of lee-boards to the owner of the James Couch when she was built about twenty years ago but he preferred and tried lee-boards. I have recommended bilge keels and they were put on the schooner America in dry dock at Chicago several years ago. So bilge keels are not new on the lakes or in the United States, but have been used more or less by those knowing their utility.

I might as well also remark on what you call "one way of securing increased speed," for instance in the case of the Virginia which is "seen to come into port with her head a foot and probably two feet out of water" being "trimmed in this way with a view to speed." I understand the meaning to be that the Virginia runs with a reduced draught forward. Any architect looking at your picture of her on the ways ready for launching would be prepared to endorse the idea that a diminished draught forward would reduce her resistance in running. Thus reducing the draught sharpens the body for running easier. All light draught vessels, where speed is an object, should run *over the water*, as a sled runs over the snow. I have built several fast steam yachts, and fully tested this principle of reduced draught forward. So that beyond the gain from immersing the screw fully, there is another gain that should be credited, to wit, the fining of the immersed bow of the vessel, especially the casing of the curves of resistance of the bow, i. e., the straightening out of the section and diagonal lines.

W. W. BATES.

Washington, D. C., August 18.

It is recorded that a ton of wheat will feed six persons for a year, so that the cargo of 100,400 bushels or 3,030 tons of wheat just taken by the steamship Emily P. Weed from Chicago to Buffolo for export is enough to supply 18,180 Englishmen with food for a twelve month.

CHICAGO LAKE INTERESTS.

WESTERN OFFICE, MARINE REVIEW,
No. 210 So. Water Street, CHICAGO, Ill., Aug. 20.

Because lake grain rates collapsed Monday it is no sign that the movement of grain is not going to be eminently satisfactory to vesselmen before long. I have never seen, so long as I have been going on the board of trade, anything like the excitement there was Monday. Every interest on 'change seemed to be centered in wheat. Lake rates, canal figures, everything was forgotten in the crush. Small wonder it was that vesselmen took 2½ cents for wheat to Buffalo. The strange thing was that they should be able to get any cargoes at all. By Friday most shippers anticipate an immense business in grain. It has kept pouring into Chicago elevators all the time, sales in the east have been stopped, but the flood will be let loose soon, and will give the boats all they can do. If three cents is not paid within a week for wheat to Buffalo I shall be greatly mistaken. But so long as wheat remains the main item vesselmen must be prepared for the movement to come to a standstill at any unexpected time, and while shippers may clamor and fall over each other for boats on day, they may not want a single vessel the next.

The delays from jams in Chicago river are said to have increased fifty per cent. over what they were last year, and the increase for that year over its predecessor was as large. At the rapid rate of increase the time is not far distant when navigation in the south branch will come to an end. At no port in the world is there as extensive commerce on so narrow and crooked a stream as the south branch of Chicago river. Col. Ludlow says there is no other river like the Chicago river in the world. Certainly there ought to be no other. The past week has witnessed a succession of vessel jams, at once expensive and amazing. It will be the same way to the end of the season. No one seems particularly to blame except someone twenty or thirty years ago, who did not preserve the south branch for the purpose of commerce. It was a sin of ommission, for which their departed spirits need a lengthy sojourn in purgatory to make them acceptable in the place where all good vesselmen go. But, candidly, it can only be a matter of time when the bulk of the marine business is driven away to the Calumet or somewhere else. With delays, at all times serious, doubled in two years, how long will it be before the strain is too heavy to be borne?

The case of the steamer S. C. Clark has been pretty well discussed. The nub of the affair is this: If a boat, given a certain class and valuation, is wrecked, are the underwriters legally bound to so repair her as that she may retain her rating? Interwoven with this main issue are other questions. If a boat, given too high a class, is wrecked, and the fact is discovered when the boat is placed in dry dock, can underwriters go behind the returns? That is, can they deny her class, and repair her so that she is as good as she was before being wrecked, paying no attention to the class she will drop to? Some of these questions underwriters may say are ridiculous, but they look upon them from one side only. Insurance men say Inland Lloyds is a private document, and concerns them alone, in fixing insurance premiums, but from the legal standpoint Inland Lloyds has a very real existence, and classes and valuations, particularly classing, must be taken into account when these issues go into the courts. In the Clark's case vessel owners and underwriters here are diametrically opposed in their views, even when having no personal interest. Underwriters say they are not compelled to repair a wrecked boat to her old rating. Vesselmen say it must be done.

The new steamer the collector at Chicago is to have for boarding purposes will be a beauty, and lake shipbuilders will doubtless contest sharply for the honor of building her. The Calumet, as it is to be called, will be constructed during the winter to be ready for sea next spring. She will be of steel, 94½ feet long, 20½ feet wide and 10¼ feet deep. Bids will be opened at Washington, Sept. 10.

Shipbuilders have been writing here to learn something of the Pan-American Transportation Company. So far as I can find out, the company is all on paper. Its mail goes to a lockbox at the postoffice. That seems to be all the office it has. One J. B. Clarke is president. Clarke, when I knew him, ran a newstand on Monroe street. From the magnitude of its designs Chicago papers have said much of the company, but that is all there seems to be to it. The company intends building ten steel steamers to trade between the Gulf ports and South America. I presume there is not enough money in the outfit to pay for one steamer's rudder and wheel. Clarke has talked glibly of $10,000,000 capital, however, but no one can see it. If lake shipbuilders wait until they get orders (with good bonds attached) from the Pan-American company there'll be no speedy boom in the shipyards.

Canadian Marine Intelligence.

Special Correspondence to the MARINE REVIEW.

KINGSTON, Ont., Aug. 20.—The grain keeps rushing in and the forwarders have all they can do. On several occasions every available barge was in active service. The work has been so constant that some of the old shovellers had to give in and were replaced by younger men. This season the shovellers are making $20 and $25 per week. So far nothing has been announced regarding an increase of rates between here and Montreal. An increase may not occur. At present the rate is 2½ cents per bushel with a ¼ cent for elevating, in which there wou'd be no profit whatever, were it not for the unusually large quantities of grain now going forward. It is expected that this will be the best season, so far as quantity is consered, in ten years, and it will be remembered that at the opening the prospects were very blue.

Large quantities of cheese are being shipped from Oswego here for export to England via Montreal. The last consignment of 2,550 boxes was brough here by the Alberta. More rye is going down the St. Lawrence this year than ever before during one season. This is caused by the scarcity in Russia and Germany.

The steamer Ontario, owned by Capt. Sweet of Carthage, has been purchased by a party of Cubans to run as a mail boat between Cuba and Central American ports on the Caribean sea. This week she made her last trip on the river, and Capt. Vernon has gone with her to her destination. The price paid was $11,000. The Ontario was burnt once and a little later was secured by Capt. Sweet on a mortgage.

The schooner Neelon, which had 2,000 bushels of damaged grain recently was placed on the dry dock, when it was discovered that there was quite a hole on her port side near the water line. She was repaired and is now on her way up the lakes. Capt. Rees has retired from the mastership of the steamer Wanderer. He says that he had too many bosses.

The recent activity in rates has made the vessel owners here somewhat independent. It is reported that some of them refused fair offers thinking that better terms could be secured in a few weeks.

It was stated here that the steamer Campana would be taken off the Cleveland-Montreal route, owing to the lack of passenger and freight business. She was placed at a great disadvantage because she could not go through to Montreal for freight. Lately, however, she has picked up a large passenger trade, and even though her rates are higher than those of her sister ships, it is announced that she is doing well and will remain on the route.

There were two collisions here last week on the river. The steamers Princess Louise and Swan came together while loaded with excursionists, and the latter came near going ashore. Both were considerably damaged, but no one was injured. Capt. Craig of the Swan declares that he will sue for damages, as the Louise did not respond to whistles, while Capt. Rothwell of the Louise says that if he had responded, the accident would have been more serious. The second collision entailed considerable loss. On Friday night the sloop Cora Post was coming up the river with 15,000 brick. There were no lights on board. The Louise struck her when she went down in a few minutes. Her crew had barely time to get on the steamer. The Post and cargo were not insured. Loss $3,000.

Oil in Boilers.

EDITOR MARINE REVIEW:—Some time ago I saw in your valuable paper an article from an engineer on "Oil in boilers." The correspondent attaches considerable blame to the engineer, by insinuating that he ought to have made more use of his blow off. I would not be pleased to act as fireman for an engineer who is everlastingly using a blow off. He would be a hard man on the owner in the matter of coal bills. He is right, however, when he says that oil gets tired and goes to the bottom, and that animal oil is very bad on boilers; mineral oil is also bad for boilers. Some engineers will dispute this, but I will explain by asking if such is not the case, why is it that mineral oil gets thicker as refining (boiling) goes on? Every school boy knows that anything that drops by a given heat will not be taken up by the same heat, and for that reason mineral oil if put into boilers in large quantities will fall to the bottom if given time and will cause trouble. Now you will say, what is to be done under these circumstances? The answer for the benefit of engineers and owners is, don't use a cheap oil, because it is cheap by the gallon, but very dear in the end. If engineers will use 600 W. cylinder oil, or something equal to it and try the small amount they can get along with, boiler troubles from such causes will be a thing of the past, owners will have nothing to kick about and certainly no large bills to pay for boiler repairs on account of oil. I always make it a point to buy no oil from a firm that uses second hand barrels or cans and for that reason never get caught in the way our friend speaks of."

O. T., Engineer.

From Leading Vessel Brokers.

Messrs. Mulrooney & Barton, Cleveland, O, Gentlemen:—Enclosed please find N. Y. draft for $2, to apply on subscription for the MARINE REVIEW. Please excuse our carlessness in not remitting this sooner. We certainly could not for a moment think of getting along without the REVIEW, which we consider, by all means, the best paper of the kind on the lakes.

Very truly yours,

Duluth, Minn., Aug. 11, 1891. ROSE & LAZIER.

THREE DOLLARS FOR TWO—THE MARINE REVIEW AND DETROIT TRIBUNE (WEEKLY) ONE YEAR FOR $2.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company.....	$100 00	$.....	$ 77 50
Champion Iron Company.....	25 00	.....	87 50
Chandler Iron Company.....	25 00	37 00	39 00
Chicago and Minnesota Ore Company.....	100 00	.....	100 00
Jackson Iron Company.....	25 00	90 00	.....
Lake Superior Iron Company.....	25 00	51 00	53 00
Minnesota Iron Company.....	100 00	70 00	73 50
Pittsburg Lake Angeline Iron Co.....	25 00	132 50	135 00
Republic Iron Company.....	25 00	25 00	26 00
Ashland	.....	.....	53 50

It was announced from the office of the Republic Iron Company Wednesday that work had been resumed in three of the mine shafts. Shafts Nos. 5 and 6 are still closed on account of the accumulation of gases resulting from the fire. A very large amount of the stock of the company has changed hands within the past two weeks. The price has held to $25 and $26 during the past few days. Shares of the Lake Angeline and Lake Superior companies are wanted. Lake Angeline has been paying regular monthly dividends of $2 a share of late.

One of closing acts of the Michigan legislature last winter calls for payment to the state of a fee on the organization of stock companies of one-half mill on each dollar of capital or 50 cents per $1,000 Some states, Ohio included, now require a fee as high as $2 per $1,000 of capital and for this reason the charge inaugurated in Michigan would seem reasonable, but there are conditions in the mining portion of the state that will cause the law to act against the weaker class of capitalists, and there is no donbt that such laws are d.trimental to the advancement of mining or manufacturing in any community. According to the mining laws of Michigan the smallest sum under which a company can organize is $500,000, and the payment of an incorporation fee of $250 on this amount is certainly excessive in the case of the poorer class of land owners, who may be endeavoring to develop a small claim of little promise. A company placing its capital at $2,500,000 would be compelled to pay a fee of $1,250. The tendency where laws of this kind have been passed has always been to drive capital to other places.

R. Angst, civil engineer of the Duluth & Iron Range Railroad, has discontinued all work of the survey of a route east from the terminus of the Port Arthur & Western, which is now graded within twenty miles of that point. A large crew was employed for the first thirty-five miles as far as Iron Mountain lake, when the force was reduced to three or four men and a survey of a more preliminary nature made the balance of the distance. Mr. Angst refuses to disclose the results or conclusions reached from the work, but it is generally believed that the route was found to be a difficult one although no worse than other roads have encountered. Whether the extension will be built or not, will of course not be known until the directors of the Iron Range have heard Engineer Angst's report and considered the other phases of the question. The Port Arthur & Western people threaten to build to Ely if the Iron Range does not extend eastward; anything is welcome so long as we have a through route from Duluth to Port Arthur.—Tower Journal.

State Geologist Van Hise of Wisconsin, who has given a great deal of attention to the Aticokan iron range, across the Minnesota border in Ontario, says that a great deal of the ore is sulphur bearing. "Geologically it is different," he says, "from any of the Lake Superior iron districts. There has been no careful exploratory work done yet and the range is doubtless overestimated. At the MacKellar location, probably the best in the new district, there may be 2,000,000 tons of ore in sight. The Canadian Pacific Railway Company persistently refuses to build a road to the range and it may be some years before it can ship ore."

The steam shovel built by the Vulcan Iron Works of Toledo, O., for the Lake Superior Iron Company has been improved in its workings so that a recent test on one of the stock piles containing hard ore that breaks in massive pieces, giving the hardest kind of a trial, showed a capacity for the machine of 2,000 tons a day. It is estimated that with this system of handling ore from the stock pile the cost will not be more than 2 cents a ton, and the loading of cars at this mine will now be conducted entirely with this system. The ore is of course, very clean in the stock pile, as it is all sorted before being raised from the mine.

At the east end workings of the Lake Angeline company, the drill has cut 40 feet of ore in the boring from the shaft to southward. This is the south rim of the deposit. In the north 28 feet were cut. This indicates a good deposit here that will be of assistance in keeping up the output to former good figures. In quality the ore is of the finest, equalling the best produced by this property. To take the ore lately encountered, the company has a substantial shaft down to the required distance, and the necessary drift connections will soon be made. —Iron Ore, Ishpeming.

An underground endless rope haulage system is soon to be put in at the Pewabic mine, most of the material for which is already on hand. The main ore body lies 850 feet from the shaft, and the new improvement will do away with a large amount of tramming by hand, which is not only slow but expensive.

Ore is being raised at the rate of 1,300 tons a day from the three mines of the Commonwealth company. Of this amount 600 tons is credited to the Badger, the new find. The Badger's output will shortly be increased to about 1,000 tons a day.

After a test lasting two months the Lake Superior Company finds that 3 cents is the fuel cost per ton of ore raised from the mine with coal at $4 a ton at the mine.

Railway Construction in the Mining Region.

A correspondent of the Engineering and Mining Journal writing about railway construction in the Michigan mining region says: "The Milwaukee & Northern Railroad Company (owned by the Chicago, Milwaukee & St. Paul Railroad Company) will certainly construct docks at Menominee and will reach the same over its own line via Ellis Junction, 22 miles distant. The work will be completed before the season of 1892. The company now ships from the port of Gladstone, utilizing the Minneapolis, Sault Ste. Marie & Atlantic line from Pembine, a distance of 50 miles. By the new arrangement the haul will not be shortened. The company has in contemplation considerable construction work for the ensuing year. At present it has a line north from Milwaukee, Wis., to Champion, Mich., and another from Ontonagon, Mich., south to Sidnaw, Mich. In connecting the two separated lines it uses the track of the Duluth, South Shore & Atlantic Railroad Company for a distance of about 50 miles. For several years it has been known that the company intended to build into the heart of the copper country from the Ontonagon branch of its line. Inasmuch as the Duluth, South Shore & Atlantic Railroad Company has a monopoly of the copper rail-freight business, it would be necessay for the Milwaukee & Northern to own its own track before it figures as a competitor. With this end in view it is soon to build from Sagola, a point on its main line 30 miles north from Iron Mountain, directly north, 55 miles to Sidnaw. The work will probably be completed in the course of a year. It is known that a survey has has been made into Houghton, Mich., from Pori, a point on the Ontonagon branch about 25 miles from Ontonagon. This line will not be likely to be built during the present year.

"The Kewaunee, Green Bay & Western Railroad Company has during the summer built a line from Kewaunee, a town located on the Wisconsin shore of Lake Michigan, 35 miles west; to Green Bay. The road-bed will be completed Sept. 1, This line, it is said, is to be a link in the chain designed to tap the great southwest. This system is made up of the Deleware, Lackawanna & Western; Flint, & Pere Marquette; Kewaunee, Green Bay & Western; Green Bay, Winona & St. Paul and about 140 miles (recently constructed) of the Winona & Southwestern, a line reaching into Iowa. The new line will obviate the necessity of navigating around the Green Bay peninsula in order to make connections with the Green Bay, Winona & St. Paul at Green Bay, and also the necessity of utilizing the tracks of the Milwaukee, Lake Shore & Western from Manitowoc, Wis., in order to put down the eastbound freight at an open lake port during the winter season."

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

JOHN M. MULROONEY, ... } PROPRIETORS.
F. M. BARTON, ... }

HOMER J. CARR, - - - Associate Editor and Manager Chicago Office, 210 South Water Street.

Published every Thursday at No. 510 Perry-Payne Building, Cleveland, O.

SUBSCRIPTION—$2.00 per year in advance. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,510 vessels, measuring 1,063,063.90 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The classification is as follows:

Class.	Number.	Tonnage.
Steam vessels	1,527	652,922.25
Sailing vessels	1,272	328,655.96
Canal boats	657	67,574.90
Barges	54	13,910.09
Total	3,510	1,063,063.90

According to the report of William W. Bates, United States commissioner of navigation, 46 per cent. of the new tonnage of the country was built on the lakes during 1889. This is a percentage greater than the work of the Atlantic coast and western rivers combined, and almost equal to the whole work on the Atlantic and Pacific coast. In 1890 the tonnage built on the lakes is but very little less than that built on the Atlantic and Gulf coasts. Tonnage built on the lakes during the past five years was as follows:

	No. of boats.	Net Tonnage.
1886	85	20,400.54
1887	152	56,488.32
1888	222	101,102.87
1889	225	107,080.30
1890	218	108,515.00
Total	902	393,597.03

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 234 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014.

Tonnage passing through Detroit river during 234 days of navigation in 1889, amounted to **36,203,606** *tons. Ten million tons more than the entries and clearances of all the seaports in the United States, and three million tons more than the combined foreign and coastwise shipping of Liverpool and London.*

Annual tonnage entries and clearances of the great seaports of the world, for 1889: New York, 11,051,236 tons; all seaports in the United States, 26,983,315 tons; Liverpool, 14,175,200 tons; London, 19,245,417 tons.

Entered at Cleveland Post Office as Second-class Mail Matter.

IN discussing the feasibility of enlarging the Erie canal to 20-feet navigation, so as to meet in American territory the demand for a deep-water outlet to the seaboard, Capt McDougall, inventor of the whaleback barges, said a few days ago: "I do not believe that anyone connected with the lake marine has given as much attention as I have to the St. Lawrence river and the work on its canals now under way. Detail preparatory to sending our barges to the coast has compelled me to go over every foot of the ground and examine into the progress of improvements, and I am thoroughly convinced that unless something is done toward providing an outlet better than the present Erie canal for the care of the immense growth in lake commerce, Buffalo will not only lose a large portion of its lake trade but the seaboard cities and railways of this country will experience a set-back unthought of, in the drift of export business through the Welland and down the St Lawrence to Montreal when these canals are completed. The work will not be delayed as long as is generally supposed, as it is mainly confined to the building of one canal and dredging in shallow portions of the river". There is certainly a great deal that is deserving of consideration in this statement. Laying aside all question of vessels of Welland canal size proceeding across the Atlantic, in the event of a completion of the St Lawrence canals to the dimensions of the Welland locks, it must be admitted that the class of vessels that could then engage in the trade to Montreal, with the long water haul and one breaking of bulk at Montreal, would be large enough to compete with even 3,000-ton vessels carrying cargo to Buffalo and transshipping by way of the Erie canal or the railways running out of Buffalo, in connection with which there is handling charges at both ends of the route.

SOME of the owners of Germany's merchant vessels have taken a bold stand with the navy of that country in the matter of steering regulations, a subject which has been discussed with a great deal of interest on the lakes during the past few years. On the boats of the North German Lloyd Company, the Hamburg Packet Company and several other big steamship companies the orders "starboard" and "port" were on July 15 dispensed with and in future when it is desired that a vessel shall go off to starboard, the order to the man at the wheel shall be "right" or "hard to right" and when a ship is to be turned to port, the order shall be "left" or "hard to left," while the word to hold to the course is simply "*stutzt*," or "hold on." These orders have ruled in the German navy for some time past and the change is now recommended by leading associations representing the mercantile marine. The new order of things grows out of agitation of the steering question, in which opposition was shown to the obvious contradiction that an order to "port" should be given when it is required that a vessel should turn off to starboard.

IT would seem that the owners of foreign built yachts will manage to evade the law by which it is thought they would be compelled to pay "light money" of 50 cents a ton every time they entered an American port. A member of the Vanderbilt family and other wealthy people in the east have had yachts built abroad, and the treasury department is engaged, mainly through the efforts of William W. Bates, commissioner of navigation, in trying to collect this tonnage tax from them. Judge Benedict, in the United States district court, decided a few days ago, however, that "yachts belonging to a regular organized yacht club of any foreign country which shall extend like privileges to the yachts of the United States shall have the privilege of entering or leaving any port of the United States without entering or clearing at the custom house or paying a tonnage tax." Owners of the foreign built craft will undoubtedly take advantage of this loophole.

COMMODORE PERRY'S flagship Niagara, sunk in Misery bay, Lake Erie, will not if raised be given a place near the navy exhibit at the World's Columbian Exposition. "The exposition is of an international character," says a member of the government board "and reminders of victories over our neighbors in Canada can have no place with the naval display." This is an objection that will probably prevent the raising and refitting of the old hull, which would form a great contrast at the side of a modern war ship. There is no special reason why private enterprise should in this case go to the expense of making an exhibit to which the government objects, and which it was thought would be cared for by the government.

PROBABLY not one in ten of the congressmen and Washington newspaper correspondents who are now the guests of Cleveland vessel owners on the big freight boats have ever seen anything of the Lake Superior country. Those among them who have finished the trip join with the members of the river and commerce committees, who went up the lakes a short time ago, in expressing surprise at the magnitude of commerce to and from the northwest. Good results in legislative matters are sure to follow these excursions.

The City of New York and City of Paris are sister ships, and in eight months their speeds average exactly the same, 19.02 knots. The Majestic and Teutonic are sister ships, but one is .16 of a knot faster than the other on an average.—The Engineer, New York.

Around the Lakes.

Capt. J. P. Hodges, a well known retired lake mariner, died at Detroit last week.

The Cramps have $14,440,000 worth of government contracts for new cruisers on hand.

John W. Rabshaw succeds Alex. Birnie as master of the propeller John C. Pringle.

On August 1, Milwaukee had received 371,364 tons of anthracite and 131,963 tons of bituminous coal.

Capt. Reed has not abandoned the schooner Golden Fleece, ashore near Dunkirk. His son is looking after the wrecking work which has been suspended on account of a disagreement with the contractors who were dredging a channel to the boat.

The Calumet, new revenue cutter or boat for boarding purposes at Chicago, will be 94 feet 6 inches long, 20 feet 6 inches wide and 10 feet 3 inches deep. The contract for her construction has not been let as yet.

Canadian customs officials at Sault Ste. Marie have been making it rather uncomfortable for Hickler Bros., sub-contractors on the Canadian canal. Their dredging plant has been seized for undervaluation. About $5,000 is involved.

Capt. Lloyd of Duluth is again engaged in an effort to raise the steamer City of Winnipeg which took fire and was sunk in the bay ten years ago. He paid $6,000 for the wreck and expects to get a return from the valuable cargo which the boat had aboard when sunk.

Wheeler & Co. of West Bay City on Saturday launched the steamer Yu Lu, owned by George D. Emory of Boston, Mass. She is a twin screw steamer, 140 feet in length, with 26 feet beam and 9 feet depth of hold. She is intended for the mahogany trade at Nicaragua, her name signifying "mahogany."

There is little doubt that Capt. James Davidson will build one or two more big wooden boats during the coming winter. He builds on his own account and has money to carry on work at all times. Moreover he has on hand a very large quantity of oak timber, 8,000 pieces, which he is desirous of working off.

The Spaulding Lumber Company of Chicago has relieved the city authorities of the duty of determining the rights of boats lying at docks where they obstruct navigation. The lumber company has brought suit against the Lehigh Valley steamer Tuscarora for $365 damages. The case is the outgrowth of the trouble the Tuscarora caused by lying at the Madison street bridge, one result of which has already been $100 fine imposed upon Capt. MacFarlane.

Now it is said that the cause of so many boats grounding on La Salle street tunnel under the river at Chicago has been found to be a cluster of stumps of spiles that were left in the river after the construction of the cofferdam for the tunnel twenty years ago. What "breakers" these would be for the bottom of an iron vessel. Chicago certainly cares little for her marine business when obstructions of this kind are left in the channel. After a great deal of trouble the city authorities have been induced to cause the removal of the spiles.

Cleveland Matters.

In two days of last week the steamships Northern King, E. C. Pope, Manola, Iosco, City of Berlin, Mariska, Mesaba, Maruba and Williams, nine boats, took 19,116 gross tons of ore from Two Harbors.

Capt. Edward Cunningham of the steamer New Orleans, who fell down the hatchway of his boat a short time ago, will recover, unless internal injuries prove more serious than is now expected.

Capt. James Devney of Ashtabula Harbor has found ready buyers for the fish tugs and other small craft built at his yard recently. Horn & Co., fish dealers of Rocky River, have just bought from him the tug James P. Manning for $3,200.

In the suit begun against the steamer Northern Queen for the loss of the schooner Fayette Brown the owners of the Queen are enabled to present matters clearly to the English underwriters who insured their boat against collision liability, but Mr. M. A. Bradley, who owns the sunken boat, says there is no more direct assurance of a settlement now than there was at the time of the collision.

The King Iron Bridge Company of Cleveland, well known in connection with dock equipment work on the lakes, has just completed the building of a steam cantilever bridge across the Ohio river between Cincinnati and Newport, which is surpassed in size by but one highway bridge in America, the East river bridge connecting New York and Brooklyn. Capital for the enterprise was secured mainly in Cleveland and New York.

The Menominee Dock Company, now being formed to operate the new Lake Shore ore docks at Ashtabula, will be controlled by Mr. M. A. Hanna and the New York capitalists owning the Chapin mine. The dock and equipment is to be leased from the railway company. The terminal company will do a general dockage business in ore. Some ore will be handled this fall and there will be no trouble in handling 500,000 tons next year. The hoisting and conveying plant when complete will comprise twenty-four legs of the Brown pattern for a dock of 1,850 feet front. With this number of legs three vessels of the largest class can be given one-day dispatch.

It is claimed that following the wrecking of the Brown hoisting plant by last week's tornado at the ore docks of the Tonawanda Iron and Steel Company, owners of some boats chartered for the Tonawanda trade refuse to allow their vessels to be sent to Ohio ports during the period of rebuilding, on the claim that their rate of freight was based on good dispatch and they should be compensated for the chances of delay at Ohio ports. The light draft vessels are certainly greatly benefited by good dispatch given at Tonawanda. Captains going there this season report better dispatch than is given to wild boats at any Lake Erie port. The hoist is expected to be rebuilt in three weeks. The loss is fully covered by tornado insurance.

In General.

Occasionally a vessel is reported to have taken on in another part of the world a cargo larger than the average on the lakes. In San Francisco a few days ago the big ship Shenandoah cleared for Havre with 186,000 bushels of wheat.

Now it is the White Star Line steamer Teutonic that leads the ocean flyers. She has just made the voyage from Queenstown in 5 days. 16 hours and 31 minutes. This is 1 hour and 37 minutes faster than the best previons record.

Notwithstanding vigorous opposition the citizens of Sault Ste. Marie, Ont., voted a few days ago to raise an additional $100,000 for the scheme to develop the water power on the north side of the Sault Ste. Marie rapids. This will make $280,000 advanced for this purpose.

The Sintz gas-electric engine, described in the last issue of the REVIEW, has two cylinders of five inches diameter each The naphtha is forced up through a pipe by a little pump worked by a camel attached to the propeller shaft. As the naphtha is pumped up the air is sucked through an opening above, and goes direct to the cylinders passing through fluid on the way and entering the cylinders as naphtha air. An electrical apparatus explodes this air in the cylinders and its action causes the pistons to churn. One piston compresses the air while the other exhausts it, and thus they work alternately.

The Maritime Register of New York says that the Saginaw Steel Steamship Company, owning the steamers Mackinaw and Keweenaw, built by F. W. Wheeler & Co. of West Bay City, is the first American company to compete with foreign steamers in the general freighting trade. The Mackinaw is now on a voyage to the Brazils. The Keweenaw sailed from New York July 19 for San Diego, San Francisco and Seattle. The officers of the company are: Arthur Hill, president; Samuel Holmes, vice-president and general manager, and James Jerome, secretary and treasurer. The offices of the company are at 100-102 Wall street, New York.

Anderson & Barr, of New York, the contractors for the construction of a light-house on Diamond shoal, off Cape Hatteras, have informed the light-house board that, notwithstanding the great loss they have already sustained in the work, they will make another endeavor to secure a solid foundation on the treacherous reef. It will be impossible, they say, to do anything before next year beyond the construction of a caission which will be larger and stronger than the one that was destroyed a few weeks ago while being placed in position. They feel confident that a permanent light can be established at that point, but think it cannot be done for much less than $2,000,000. Their contract price is $485,000, being within $15,000 of the available appropriation.

The Passenger Steamer Pilgrim.

The Pilgrim, built and owned by Sloan, Cowles & Sloan, is a spendid passenger boat, chiefly because she stands up with a crowd and does not list. She is 125 feet long, 26 feet in beam, and is allowed 800 passengers. Her engine, fore and aft compound, built by Sutton Brothers, is 15 and 30 by 18 inches stroke and her boiler 12 feet by 7 feet 8 inches. She runs about 11 miles an hour, and can be crowded about 2 miles more. She is quite popular, because she has so much deck room.

The Fisher Electric Company placed the electric equipment on the Pilgrim and it is said to be one of the most compact lighting plants on any lake steamer. The engine and dynamo are mounted on a sub-base, the armature and engine shaft being in one continuous piece. The engine and dynamo run at a speed of 375 revolutions per minute, developing an e. m. f. of 110 volts that will sustain 100 16 c. p. lamps. This system of lighting is recommended and preferred where purchasers are willing to pay the additional cost. It is more compact, it runs at a slow rate of speed and there is absolutely nothing for the engineer to do but to keep the oil cups filled. The boat is brilliantly lighted by 80 incandescent lamps, controlled from the engine room by a six-circuit standard switch-board, the switches being mounted on marble bases together with the calibrating instruments and are equipped with safety devices. The driving engine is manufactured by the John T. Noye Manufacturing Company, of Buffalo.

Across in a Dory.

Capt. J. W. Lawlor, of Chelsea, Mass., who sailed from Boston on the afternoon of June 21 in his little 14-foot boat, the Sea Serpent, arrived in safety at Coverach, near Lizard point, in the English channel, August 5. He had some thrilling adventures. A big shark alongside tried to gnaw the bow of his boat off. Lawlor wrapped up some rockets in a paper, lit the fuse and threw the parcel overboard. The shark grabbed it just in time and it blew his head open. His boat capsized twice. Once he had to jump on her keel to right her and had it not been for the rope which he kept constantly fastened around his body, he could never have got on board again. Capt. W. A. Andrews, who sailed from Boston in the Mermaid, a boat similar to the Sea Serpent, at the same time, was last spoken on July 27 on the banks of Newfoundland.—Marine Journal.

Similar to the Virginia.

The Fairfield Shipbuilding and Engineering Company has recently completed a twin-screw passenger steamer for service between Barrow and Liverpool and the Isle of Man, that is very like the Virginia, now in service between Chicago and Milwaukee. The dimensions of the Tynwald are 265 feet long, 34½ feet beam and 24½ feet deep, the gross tonnage being 946 tons. Her engines are 22, 36 and 57 inches by 36 inches and she has two boilers 16 by 18 feet. The support of propeller shafts is different from that in the Virginia. Instead of the A frame forming part of the same forging as the stern frame, there are supporting arms of steel plates riveted together, It is claimed to be cheaper than the other method. The steam pipes in the Tynwald are of lap-welded iron instead of copper, the latter being liable to breakage under high pressure. On a measured mile the Tynwald made 19.16 knots and on her regular run she makes between 18 and 19 knots.

Oil in Boilers.

A Buffalo correspondent writing the Engineer of New York regarding the accident a short time ago to the boilers of the whaleback steamer A. D. Thomson, says it is a pity that the engineer of the boat was not advised sooner of the danger of oil in the boilers. "It would have saved trouble and expense on two as good boilers as could be made", he adds. " The furnaces on this vessel dropping on the first trip, the boilers were tested with 240 pounds pressure, and were allowed to work at 160 pounds on the trip from Duluth to Buffalo. All four furnaces dropped one with 140 pounds on, and the other with 125 pounds. When these boilers were tested, they were highly commended by the inspectors and engineers that saw them tested. The furnace dropped before the vessel got to the Sault, and from there they carried only 40 pounds. When the vessel arrived here, the foreman, or proprietor, of the boiler shop was sent for. Before the foreman got down they had one boiler blown off. The other had 40 pounds on; he waited for some time, but the steam getting lower, he (the foreman) advised to blow it off at 40 pounds; this was done, and when all pressure was off, the bottom manhead was taken out, and at the very least, twelve gallons of oil ran out with the water. As luck would have it, the foreman had the inspectors with him and they saw what a plight the boilers were in. The chief engineer contended that oil was not the cause of the furnace coming down, but poor material. Now, the furnaces were made of steel ½ inch thick, 45″ outside diameter and 24″ between rings, and it was the second and third courses that went down, on or near the quarter; not on top, mind you, but near the quarter of the circumference. One chief engineer of a line of boats that runs from here said the sheets were laminated, and one of the pockets was cut out; of course it showed no sign of lamination, and could not, as the steel was the best ingot steel made".

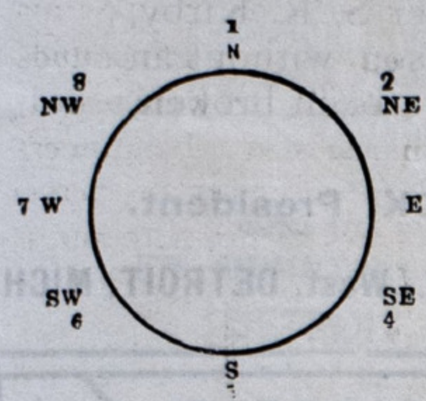
"When I went down to look at these furnaces the sides from the pockets down on the furnace flues, and under side of tubes, were covered with oil. The engineer, or chief as he is called, said to the government inspector, when the inspector told him of there being to his knowledge ten gallons of oil in the boilers, that they only used six gallons of oil on the the trip down, but he did not take into account all the oil that was used while trying the engine, and as the manheads, to the best of my belief, had never been taken off since the boilers left the shop, I don't think he or any one else could swear to what amount of oil went in the boiler through the condenser, as that must have been the way it got in. It is surprising how many will advocate the use of oil to keep the scale off the tubes, fire boxes and other parts of boilers, when, if they would but give one thought to it, they would see the detriment to the life of the boiler. It is well known that oil is lighter than water (till it gets loaded), and will float to the top; but as soon as the water commences to throw up sediment the oil will catch it; then the oil is the heaviest, and in falling will affix itself to whatever it strikes, and all greasy substance will keep water away from heated surfaces. This is the cause of bulges on crown and sides of fire-boxes, and of the burning of the same, or as some would call it over heating."

Roberts Boilers.

The Roberts Safety Water Tube Boiler Company, No. 18 Cortlandt Street, New York, and Red Bank, New Jersey, report a very favorable season. They have sold seventy-one of their boilers this season, so far, with more orders coming in, and all the boilers are giving thorough satisfaction. Three hundred and forty-one of these boilers have been sold altogether, and the works now cover over 12,000 square feet of ground, and contain many expensive and special tools for building the boilers, which are all made of special material manufactured for this purpose only. They report four or five boilers still remaining in stock as a result of change in dimensions by some of their customers. Parties requiring a good boiler, all ready for immediately delivery, would do well to communicate with them. They are highly approved by the United States steamboat inspector.

A Proposed Code of Fog Signals.

In a letter to the Maritime Register of New York, C. A. Haldt of Philadelphia refers to discussion during the past several years, in which it has been claimed that a uniform code of fog signals, plain enough to be generally understood, cannot be secured. "After mature thought," he says "I have made out the following code, which is indeed a very simple one, and which I think will solve the problem :



"Now, the accompanying cut represents the face of the compass, and these numbers could easily be placed on any compass just as they are here, and this would mean that when a vessel is steering a northerly course, to blow one long whistle ; if southerly, blow five short blasts ; if southeast, four short blasts, and so on, just as it is numbered. This code would, of course, always be marked distinctly on the compass and always in view of the man at the wheel on the bridge, and therefore not easy for anyone to make a mistake. I think that this, not being at all complicated, to be a great improvement over the present mode, and one that might be adopted with success. In reference to vessels at anchor, all that would be necessary to do would be to give nine short blasts, which, of course, could easily be counted."

A Powerful Steam Crane.

The current issue of Industries of London, illustrates and describes a huge steam crane, built by Messrs. Ransomes & Rapier of London, to be used on the Madras harbor works, where it will be chiefly employed in transporting blocks of concrete weighing thirty-two tons, in the construction of a breakwater. The weight of the crane or Titan as it is called, without water ballast or load, is 152 tons, and with ballast 170 tons. A feature of importance in connection with this appliance is that it not only has to be capable of slueing around in a complete circle, but has also, owing to the shape of the breakwater on which it will be employed, to be capable of traveling on a curved road. To enable it to accomplish this the Titan is carried upon twelve wheels arranged as two four-wheeled bogies, one at each end, and with driving wheels in the center. This arrangement enables the crane to travel with ease round a curve 90 feet radius. The radius described by the arm is 50 feet, and to minimise the shock produced by stopping a load, owing to the momentum acquired when being slued round, spring breaking devices are introduced in connection with the gearing so as to bring the arm to a gradual stop. The crane is made of mild steel, all parts being carefully machined, and all rivet holes drilled in position. The whole of the work is so arranged that it can be conveniently taken to pieces for transport and reerected at its destination with a minimum of trouble. The crane has been put through a series of tests and has been found to handle forty tons without difficulty.

Admiralty Notes.

Judge Green of the federal court, New Jersey, says in deciding an admiralty case heard recently : A maritime lien for repairs, based on a running account extending over nearly four years, during the whole of which time the account was largely reduced by payments made with considerable regularity, the last within a week, before the libel to enforce the lien was filed, is not barred by laches, though the last repairs were made nearly a year before the libel was filed; and the claim of the libelant should not be postponed to those of others. who made repairs and furnished supplies to the vessel while payments to the libelants were being made.

When a vessel is attached and sold as perishable, and the resulting fund paid into court for distribution, a libel for a debt acknowledged to exist, the lien of which was discharged by the sale, will not be dismissed even if the debt was not due at the time the suit was brought.

Progress of the Twin-Screw.

Success with the twin-screw steamship Virginia of the Goodrich line will be an incentive to the building of this class of vessels on the lakes. This country was slow in adopting the triple expansion engine as well as the compound engine twenty years ago. The progress of the twin-screw will eventually find as much employment for the shipbuilder and marine engineer as did the introduction of the new types of engine, and the experiment with a triple screw, which the United States navy is now carrying out in one of its most important vessels, will add inter- to the advancement of naval science in this regard.

Marine Engineering During tne Past Decade.

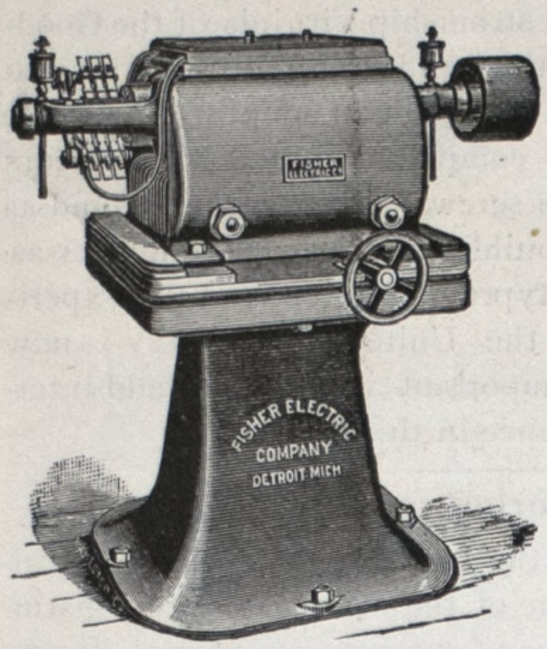
At the summer meeting of the Institute of Mechanical Engineers, just held in London, one of the members of this distinguished organization in a review of marine engineerieg during the past decade made the following brief conclusions: First, the working pressure has been about doubled; second, the increase of working pressure and other improvements have brought with them their equivalent in economy of coal, which is about 20 per cent.; third, marked progress has been made in the direction of economy of dimension, more than twice the former power having been put into certain vessels; fourth, substantial advance has been made in the scientific principles of engineering.

Another paper by Mr. G. R. Brace had reference to one of Lloyds rules on holds with double bottoms. The rule requires that "in the double bottom of each compartment of the hold and of the engine and boiler space a steam pump suction is to be fitted at the middle line, and one on each side to clear the tanks of water when the vessel has a heavy list. Where there is a considerable rise of floor towards the ends of the vessels the middle line suction only will be required." It was claimed that these requirements were more than was necessary for the safety of ships at sea. The author of the paper had made a series of investigations, the results of which were given, and they proved conclusively in his opinion that one suction in each tank is quite sufficient to empty it, if the ship has enough stability to go to sea with safety.

Ten years ago, say in the month of July, 1881, how did matters stand as regards advance in marine engines? The fastest ocean steamer afloat was then the Arizona, with a speed of a little over 16 knots at her best. The fastest run from Queenstown to New York was 7 days and 8 hours. The best and most approved type of engine was the compound. The name of "triple expansion" was not known. The term "forced draught" conveyed no meaning, Ships and boilers of steel were a novelty which many engineers would like to see more thoroughly tried before pinning their faith to them. The name of Atlantic greyhound was not yet heard. Yet it was just at the threshhold of the new time. Every one in the summer and autumn of 1881 was interested to know how the new Atlantic liners, the City of Rome and the Servia would behave on their first trip across the Atlantic, which was to take place before winter, and every one who took an interest in the matter was aware that these steamers would be followed up by others within a very short time which would almost certainly cast into the shade the best of their performances. That anticipation, as we all know, has been more than fulfilled. A run of less than 7 days was for the first time made to New York in May, 1882, and this was soon followed up by better runs—the Oregon and the America improving on the best time of the Alaska; and they were again cast into the shade by the Umbria and Etruria, which appeared, the first named in the autumn of 1884 and the other in the spring of 1885; till at length in May, 1889, the City of Paris, for the first time, made the run under 6 days. It is therefore strictly true that the great advance in speed and results of engineering work falls within the last ten years, and without triple expansion engines and forced draught these results could never have been obtained.

THE DETROIT TRIBUNE (WEEKLY) AND THE MARINE REVIEW, ONE YEAR, $2, THE PRICE OF ONE.

SEE CAPT. PECK'S LETTER Regarding Incandescent Lighting Plant on the Steamer S. R. KIRBY.



NORTHWESTERN TRANSPORTATION CO.

DETROIT, MICH., Oct. 7, 1890.

FISHER ELECTRIC CO.,
Detroit, Mich.,

GENTLEMEN :—Replying to your inquiry regarding the operation of the 200 Light Incandescent Plant placed on the Steamer S. R. Kirby, we wish to say that the plant has operated during the season without an interruption and has not cost us one cent. No Lamps have been broken, and we would not be without it. Very truly yours,

E. M. PECK, President.

FISHER ELECTRIC COMPANY, 183, 185 & 187 Larned St., West, DETROIT, MICH

VESSEL AND MACHINERY EXCHANGE.

Space under this heading may be used gratis by our advertisers or subscribers to call attention to vessels or any craft, machinery, new or second hand, that they may have for sale. Those wanting machinery of any kind, or wishing to purchase vessels, are invited to take advantage of the same offer. Each item will be limited to three lines. Letters concerning same must mention number attached to item and be addressed MARINE REVIEW, 510 Perry-Payne Building, Cleveland. O.

64—For Sale at a Bargain—Steamboat 78 feet over all, 18 feet beam; double engines; hull in first-class condition.

65—For Sale Cheap—Two 10 x 10 Marine Engines with two 4 feet 4 inch wheels; good shafting, heater, boiler, steam pump and connections; or will exchange for small yacht or real estate.

66—Steambarge that will carry 200 tons wanted for balance of season, or longer.

67—WANTED—To purchase a tug suitable for fishing purposes 60 to 80 feet long, engine 10 to 12 square; must have good deck room and be in good condition.

68—WANTED—Engineer to purchase small interest in a dredge.

69—WANTED—700-ton steamer with large per cent. of fullness.

70—Dredge hull wanted, or parties wanted to buy machinery for same.

71—60-foot sloop yacht with roomy cabin containing two state rooms.

1867. PERFECT SATISFACTION GUARANTEED. 1891.

A. G. HARBAUGH & CO.,

34 & 36 River Street, CLEVELAND, O.

Manufacturers of Strictly Pure and Acidless Lard Oils, specially adapted for Steamboat use.

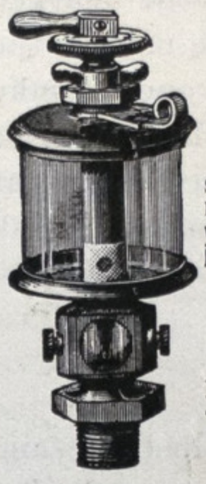
Will furnish Brand free for Ship Chandlers or other dealers who desire their name and address on packages.

RARE CHANCE for capitalists to invest eight or ten thousand dollars in boats that have recently been patented and will pay from thirty to fifty per cent. per annum. Can be used in numbers of places in the United States. For further particulars address **MARINE REVIEW.**

MICHIGAN READERS OF THE REVIEW SHOULD TELL THEIR FRIENDS THAT THEY CAN HAVE THE MARINE REVIEW AND DETROIT TRIBUNE (WEEKLY) ONE YEAR FOR $2.

Nickel Plate Excursion, August 17. Ninth annual Niagara Falls outing; Chautauqua free; Toronto, $1 extra; liberal limits. Stop over to visit friends granted on return trip at Brocton or points west. Inquire of Nickel Plate agents.

Powell's Signal Oilers.



INCOMPARABLE FOR ENGINES AND DYNAMOS.

Convenient to fill.

Easy to regulate.

Flow of oil can be instantly shut off by simply moving the lever down—**without disturbing the adjustment.**

Also made Double and Triple Sight feed for Marine Engines.

Your dealer can supply you. Manufactured by

The Wm. Powell Co.,
CINCINNATI, O.

ENGINEERS ONCE USING "SINCLAIR" BRAND KEEP TO IT

PURE LARD OIL ONLY

SEND FOR FREE **SAMPLE** TO THE MANUFACTURERS, WHO GUARANTEE ITS ABSOLUTE PURITY.

T. M. SINCLAIR & CO.,
CEDAR RAPIDS, IOWA.

WRECKING AND TOWING COMPANIES.

I. H. OWEN, PRESIDENT, Chicago. F. H. VAN CLEVE, SEC. Escanaba. CAPT. GEO. BARTLEY, SUPT. Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready.

TUG MONARCH, Engine Compound, Cylinder 16 and 30 inches diameter, 30 inch. Stroke, Steam Pressure Allowed, 125 pounds.
TUG DELTA, Cylinder 20 by 22, Steam Pressure Allowed, 105 pounds.
TUG OWEN, Cylinder 20 by 20, Steam Pressure Allowed, 104 pounds.

CENTRIFUGAL PUMPS, Seven and Fourteen Inch Suction.

V.O.T. LINE OF TUGS.

ALVA B. JOE HARRIS.
H. L. CHAMBERLIN. TOM MAYTHAM.
W. D. CUSHING. C. G. CURTISS.

W. A. COLLIER, Manager.

Office, Main Street Bridge, Telephone 409. **CLEVELAND.**

Steam Pumps, Hawsers, Lighters, etc., furnished on short notice.

ERIE OIL COMPANY,

HIGH FLASH. **ERIE, PA.,** MANUFACTURERS OF THE **HIGH VISCOSITY.**

Monarch Valve Cylinder and Engineers Valve Oils,

THE MOST PERFECT CYLINDER OILS FOR MARINE USE.
EVERY BARREL GUARANTEED.

Duluth, South Shore & Atlantic Railway,

OVER 100 MILES SHORTER than any other line between And Principal New England and Canadian Points and the great Northwest. **BOSTON, MONTREAL,**

THE ONLY LINE TO ST. PAUL AND MINNEAPOLIS, VIA DULUTH,

The New Short Line from principal points in Michigan to DULUTH, PACIFIC COAST and intermediate sections. RATES ALWAYS THE LOWEST.

New and elegant Wagner Vestibule Buffet Sleeping Cars on through trains. For time tables, tickets ad general information call on nearest ticket agent or write to

C. P. FLATLEY, Genl. Western Agt., 291 Jackson Street, ST. PAUL, MINN.
V. DEARING, District Pass. Agt., 202 Main Street, JACKSON, MICH.
T. H. LARKE, Commercial Agt., 327 Superior St., DULUTH.
W. F. FITCH, Genl. Manager, C. B. HIBBARD, Genl. Pass. & Tkt. Agent, MARQUETTE, MICH.

DIXON'S GRAPHITE PAINT

SHOULD BE USED ON ALL

Smoke-Stacks, Boiler-Fronts, Locomotive and Steamboat Stacks, Smoke Arches, Ash-Pans, Steam-Pipes and other Iron-Work.

If you have use for such an article it will pay you to send for circular and testimonials.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J.

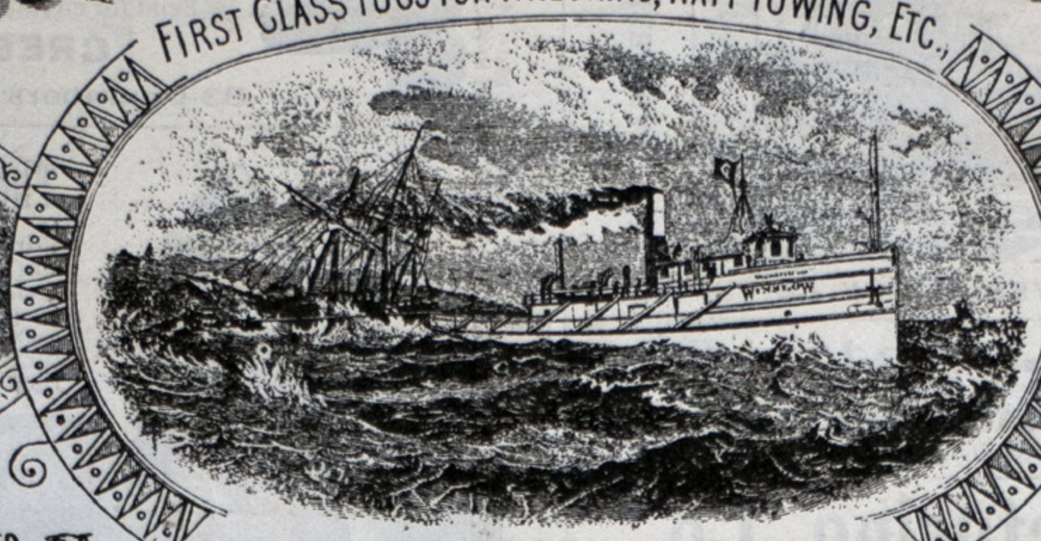
DIXON'S GRAPHITE PAINT

S. B. GRUMOND,

OWNER OF TUGS

WINSLOW,
LEVIATHAN,
SWEEPSTAKES,
CRUSADER, M. SWAIN,
CHAMPION, JOHN OWEN,
WM A. MOORE &
OSWEGO.

FIRST GLASS TUGS FOR WRECKING, RAFT TOWING, ETC.,



EIGHTEEN
STEAM PUMPS,
ROTARY WORTHINGTON &
CENTRIFUGAL HYDRAULIC JACKS.
SUB MARINE DIVERS, HAWSERS,
LIGHTERS &C.
WAREHOUSE & OFFICE ON
DOCK, FOOT OF
FIRST ST.

OFFICE OPEN DAY & NIGHT
☞ SATISFACTION GUARANTEED. ☜
DETROIT, MICH.

BRANCH OFFICES AT PORT HURON, & CHEBOYGAN MICH

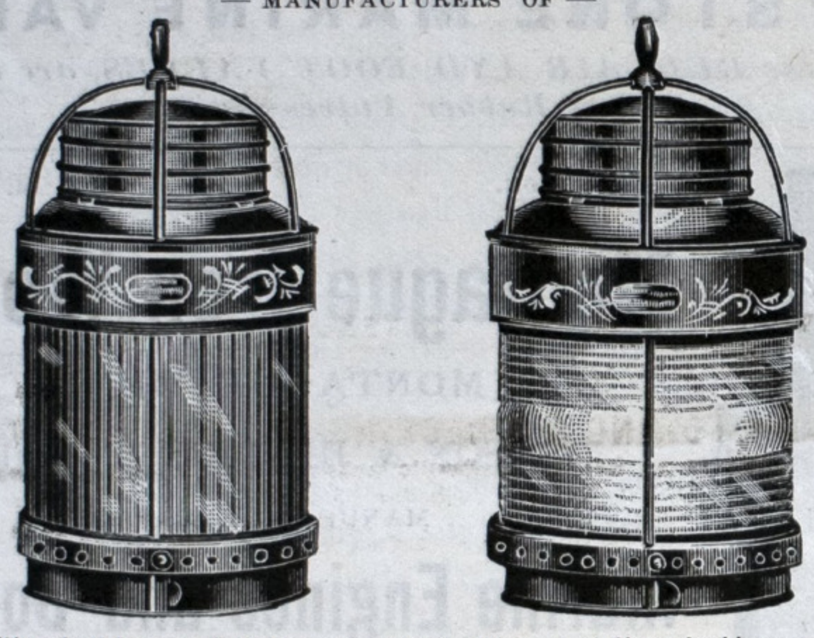
WRECKING TUG LEVIATHAN STATIONED AT CHEBOYGAN
WITH PLENTY OF WRECKING MATERIAL ON BOARD AND IN WAREHOUSE.

McBEAN, EDGE & CO.,

Steamboat Sheet Iron, Tin and Copper Workers,

— MANUFACTURERS OF —

SIGNAL LAMPS



With patent lenses, fluted or corrugated, with corrugations inside or out.

STEEL RANGES for Steamboats and Hotels.

HEAD LIGHTS, ENGINEERS' SUPPLIES,

Anchor and Binnacle Lamps; Square, Triangle and Canalboat Head-Lights; Torches, Coal Oil Lamps, Lanterns, Chimneys, Wicks, &c.

Telephone 803. 33 Main St., BUFFALO, N.Y.

Commercial Union Assurance Company, Limited,

OF LONDON.

INLAND MARINE DEPARTMENT.

DAVID VANCE & CO.,

General Agents,

MILWAUKEE, WIS.

INSURES HULLS,
CARGOES and FREIGHT.

Local Agents at all Lake Ports.

TRAVELERS' REGISTER.

Standard time, given here, is 33 minutes slower than City time.

THE NEW YORK, CHICAGO & ST. LOUIS R. R.

	Arrive East.	Depart East.
Buffalo Passenger	10 40 AM	10 45 AM
Chicago Passenger	9 20 PM	.....
Local Freight	4 00 PM	.....
WESTWARD.	Arrive.	Depart.
Chicago Passenger	.....	6 30 AM
Fostoria Passenger	6 40 PM	7 00 PM
Local Freight	3 50 PM	6 00 AM
Lorain Accommodation, Departs		5 10 PM
Dover Accommodation, Departs		1 30 PM and 5 10 PM

All trains daily except Sunday.

ERIE RAILWAY.

	Arrive.	Depart.
Youngstown Accommodation	*7 15 AM	†6 00 AM
New York and Pittsburg Express	†5 15 AM	*8 10 AM
Pittsburg Accommodation	*12 30 PM	*11 25 AM
New York & Pittsburgh Limited	*9 55 AM	*2 55 PM
Mantua Accommodation	*7 20 PM	*4 20 PM
Youngstown Express	†9 10 PM	†6 00 PM
New York & Pittsburgh Express	*6 50 PM	*11 00 PM

* Daily. † Daily except Sunday.

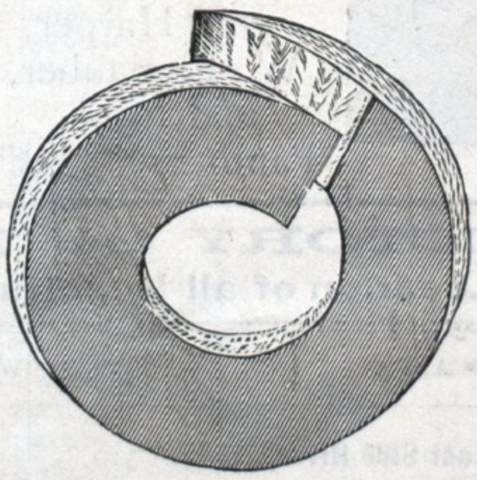
The short and direct route to Pittsburg, Washington and Baltimore. Only 4½ hours to Pittsburg; four trains daily.

For tickets, sleeping car space and further information address City Passenger Agent, 141 Superior St., (Weddell House block,) or Central Passenger Station, South Water Street.

A. M. TUCKER, Gen'l Manager, Cleveland, O. G. E. FOUTS, C. P. and T. A., Cleveland, O.

W. C. RINEARSON, Gen. Pass. Agt., New York.

GOULD'S STEAM AND WATER PACKING.



Pat'd June 1, 1880—The Original Ring Packing.

For Piston Rods, Valve Stem of Steam Engines, Steam Pumps, and especially adapted for Marine Engines and Electric Light Plants.

☞ In ordering, give **exact** diameter of Stuffing Box and Piston Rod or Valve Stem.

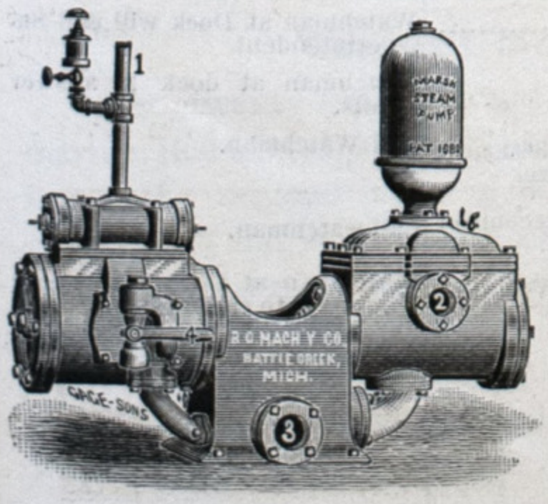
Self-Lubricating, Steam and Water Tight.

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. **Every Package Fully Warranted.**

N.B.—This packing will be sent to any address, and, if not satisfactory after a trial of 30 days, can be returned at our expense. None genuine without this trade-mark and date of patent, stamped on wrapper. **All similar Packages are Imitations, and calculated to deceive.**

THE GOULD PACKING COMPANY,

TRADE-MARK. ALBION CHIPMAN, Treasurer, East Cambridge, Mass.



MARSH STEAM PUMP,

Absolute Actuation and Regulation Without Use of Tappets, Levers or other Mechanical Connections.

FOR MARINE AND STATIONARY BOILERS.

Smaller Sizes With or Without Hand Pumping Attachment.

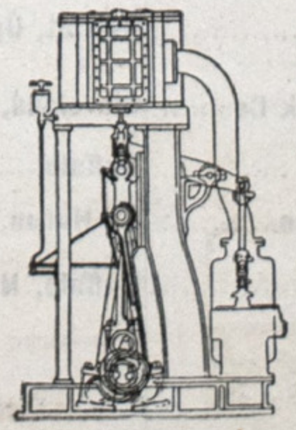
Exhaust Returned to Boiler. Heats Feed Water Forty to Fifty Degrees, according to tests made by Prof. M. E. Cooley, of the University of Michigan.
Steam Valves Actuated by Direct Boiler Pressure.

Has Fewer Wearing Parts than ANY OTHER Steam Pump.

For Circulars and Prices, address

STRONG, CARLISLE & TURNEY, Cleveland, O. STANNARD & DILLON, Chicago, Ill.
DETROIT SHEET METAL & BRASS WORKS, Detroit, Mich. H. P. TOBEY, Toledo, O.
or BATTLE CREEK MACHINERY CO., Manufacturers, Battle Creek, Mich.

THE O'CONNELL GREASER,



During the past three years hundreds of marine engines of from 2,000 to 4,000 h. p. have been served, as well as high speed electric light engines.

RESULTS:

Sure control of Crank Pin.
Stoppage of Lard Oil account.
Perfectly clean Engine

O'Connell & Cahill,
Manistee, Mich.

Dark lines indicate apparatus.

CON. STARKE. JOS. WOLTER. AUG. RIEBOLDT.

RIEBOLDT, WOLTER & CO.,

SHIPBUILDERS,

SHEBOYGAN, WIS.

FLOATING DRY DOCK WILL LIFT VESSELS OF 400 TONS.

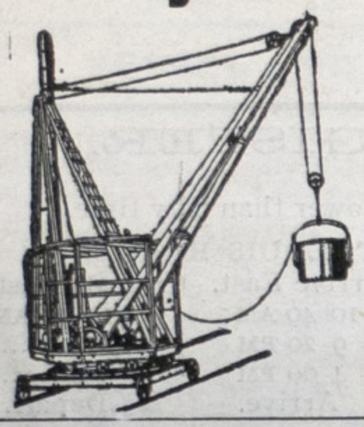
H. D. ROOT, Lorain, O.

Established 1853.

SHIPBUILDING AND GENERAL REPAIRING.

TUGS AND STEAM YACHTS A SPECIALTY.

McMyler Manufacturing Co.,



180 Columbus St., Cleveland, O.

Sole Manufacturers of the

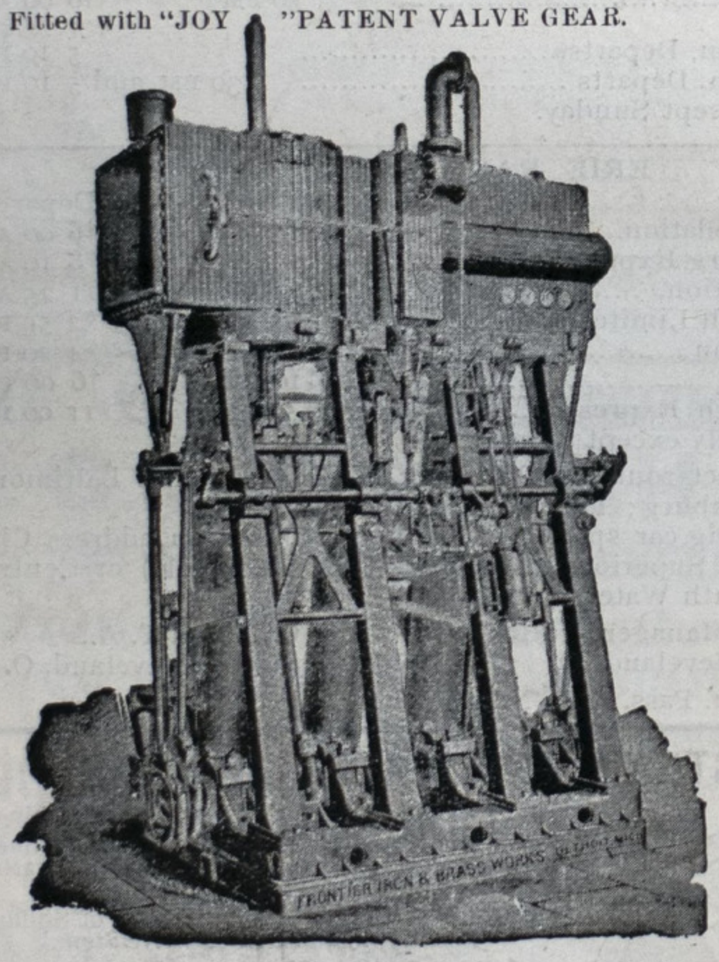
McMYLER PATENT

Revolving Steam Derrick

General Hoisting and Conveying Machinery, Ore and Coal Buckets and Dump Cars.

THE FRONTIER IRON WORKS,

Fitted with "JOY ... "PATENT VALVE GEAR.



DETROIT, MICH.,

Builders of

TRIPLE EXPANSION

and all kinds of

Marine Engines

Engines furnished for Steamships:

T. W. Palmer,
Livingstone,
Majestic, Tampa,
John Mitchell,
Nyanza, Fedora,
Geo. F. Williams,
Mackinaw,
Keweenaw,
Jno. Harper,
W. F. Sauber,
and Iosco.
Panther, (fore and aft compound)

Trade Mark Registered Sept. 24, '89, No. 17054

MANHATTAN SELF-LUBRICATING PACKING.

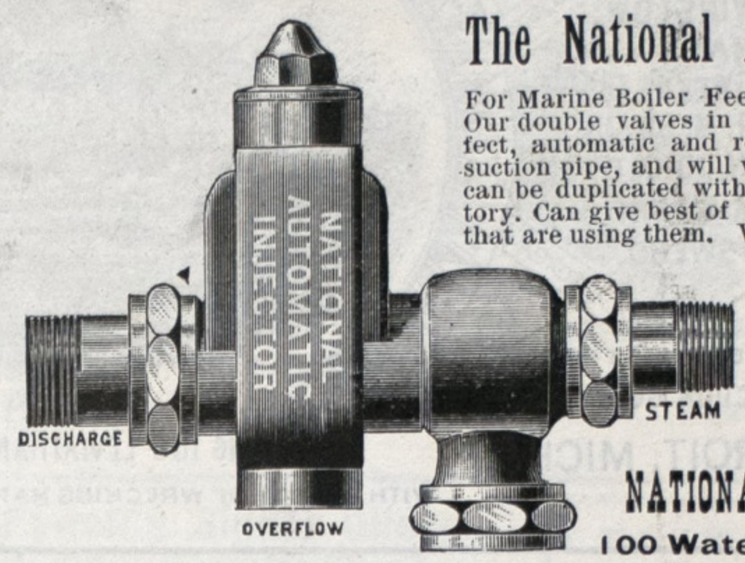
Is the BEST to be had for Steamers, Locomotives, Stationary Engines, Pumps, with oil, hot or cold water Valves, Steam Hammers, etc. It is made round and square.

Send for circulars, or sample for trial to

GREENE, TWEED & CO.,

83 Chambers Street, - New York, N. Y.

The National Automatic Injector.



For Marine Boiler Feed it is superior to any other. Our double valves in overflow makes it most perfect, automatic and reliable; will lift with hot suction pipe, and will work water 140 hot. All parts can be duplicated without sending Injector to factory. Can give best of testimonials from engineers that are using them. Will send Injector to any reliable party on a guarantee. Give the National a trial, then decide for yourself if you want it or not. We also make the National Ejector. Send for Descriptive Price List. ☞ Agents wanted in every locality. Prices always the lowest.

NATIONAL BRASS MAN'F'G CO.

100 Water St., CLEVELAND, O.

ERIE RUBBER CO.,

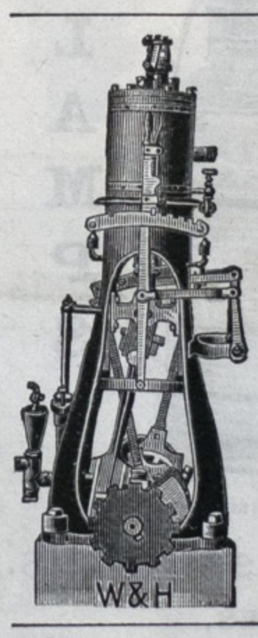
ERIE, PA.,

——MANUFACTURERS OF THE——

KEYSTONE MARINE VALVE.

These RED, AIR AND FOOT VALVES, are the Best Rubber Valves made.

J. D. WILSON. M. HENDRIE.



Montague Iron Works,

MONTAGUE, MICH.

WILSON & HENDRIE, Proprietors.

MANUFACTURERS OF

Marine Engines and Boilers,

AND GENERAL MILL MACHINERY.

HENRY B. BURGER. GEORGE B. BURGER

H. B. & G. B. BURGER,

MANITOWOC, WIS.

Ship Builders and Contractors.

Dock will admit vessels of 1200 tons and boxes will lift 350 ton vessels. Yard is fitted with a large spar derrick, and a stock of spars always on hand.

DIRECTORY OF LAKE DRY DOCKS,

Giving Dimensions and Location of all Important Docks, for Information of Owners and Masters.

DOCK.	LOCATION.	Length on Keel Blocks.	Width of Gate.	Depth of Water on Sill and Keel Blocks.	SPECIAL ADVANTAGES.	FOR NIGHT SERVICE.
Bay City Dry Dock & Ship Y'd Co.	Bay City, East Side River,.....	310	42½-43½	13–14	Nearest Dock to Mackinaw and Sault Ste. Marie.	Call Foreman Edward Trahan, cor. McEwan and Water Sts.
Cleveland Dry Dock Co.	Cleveland, So. Side River Bed,	312	40 ft. 8 in.	11½–12	Nearest Dock to Harbor Entrance.	Watchman at Dock. Manager, 75 Duane St. Foreman, 126 Fulton
Clark Dry Dock Co.....	Detroit, Lower Docks,.....	360 220	68 42	10½ 9 upper 11½ 10 end.	.....	Watchman at Dock will call Superintendent.
Detroit Dry Dock Co.	Detroit, Upper Docks,.....	239	42	8	Rebuilding.	Watchman at dock to answer calls.
Ship Owners' Dry Dock Co.....	Cleveland, Head Old River Bed	340	50	18	Depth of water enables loaded vessels to dock here.	Call Watchman.
Union Dry Dock Co.....	Buffalo,..... Upper, Lower,	343 343	48 44	10½ 15½	Three steam derricks connected with each dock.	Call watchman.
Wolverine Dry Dock Co.....	Pt. Huron, near Water Works.	200	40	14	Dock Waterlogged Vesssls.	Watchman at Dock, nights and Sundays to call foreman.
R. Mills & Co.....	Buffalo, N. Y.	280 320	40 46	12 13½	Boom Derricks.	Call Watchman.